

weight that of the multiacrylic monomer and wherein the ratio of the weight of the epoxy resins to that of the acrylic monomers is between 3 to 10; and

b) a combination of a free radical initiator and a photo-generating acid precursor characterized by optical molar extinction coefficients and optimized for use with a multi-wavelength argon ion laser operating in the UV and producing two major wavelengths of 351 nm and 364 nm such that a normalized ratio of the extinction coefficients of the precursor and the initiator at one major wavelength is less than 3 times the ratio of extinction coefficient at a second major wavelength.

2. (Amended) A method for accurately fabricating an integral three dimensional article having improved green strength by controlling the diffusion of photoactivated molecular species in the regions of a photohardenable liquid composition exposed to actinic radiation, the method comprising the steps of:

- (a) forming a layer of the photohardenable liquid composition;
- (b) imagewise exposing areas of at least a portion of the layers to actinic radiation at wavelengths of 351 nm and 364 nm;
- (c) introducing a new layer of liquid on to the layer previously exposed imagewise in step (b);
- (d) imagewise exposing at least a portion of the new liquid layer to actinic radiation, wherein the improvement comprises use of photohardenable liquid composition comprising:

- a) a mixture of photopolymerizable resins consisting essentially of
  - at least two epoxy resins, said at least two epoxy resins including a first epoxy resin polymerizing at a slower rate and having a higher neat viscosity than at least one other epoxy resin present, said first epoxy resin being present at a concentration in the mixture of from 5 to 25% by weight, and

- at least one monoacrylic monomer and at least one multi-acrylic monomer wherein the concentration of the monoacrylic monomer is from 0.12 to 0.90 parts by weight that of the multiacrylic monomer and wherein the ratio of the weight of the epoxy resins to that of the acrylic monomers is between 3 to 10; and

- b) a combination of a free radical initiator and a photo-generating acid precursor characterized by optical molar extinction coefficients and optimized for use with a multi-wavelength argon ion laser operating in the UV and producing two major wavelengths of 351 nm and 364 nm such that a normalized ratio of the extinction

coefficients of the precursor and the initiator at one major wavelength is less than 3 times the ratio of extinction coefficient at a second major wavelength.

3. (Amended) A photohardenable composition comprising:

- (i) a mixture of cationically polymerizable components having at least two epoxy resins, said at least two epoxy resins including a first epoxy resin polymerizing at a slower rate and having a higher neat viscosity than at least one other epoxy resin present,
- (ii) a blend of radically polymerizable components;
- (iii) at least one photo-generating acid precursor;
- (iv) at least one free radical initiator; and
- (v) water;

wherein said high-viscosity, slow-curing cationically polymerizable component has a viscosity of greater than 1000 poise @ 25°C and a viscosity of greater than 200 poise @ 52°C.

Please cancel claims 4-6 without prejudice or disclaimer.

7. (Amended) The composition of claim 5 wherein said first epoxy resin has a softening point below 40°C.

8. (Amended) The composition of claim 3 wherein said mixture of cationically polymerizable components comprises, relative to the total weight of said at least two epoxy resins, from 5 to 25% by weight of said first epoxy resin.

9. (Amended) The composition of claim 8 wherein said first epoxy resin has a viscosity of greater than 1000 poise @ 25°C.

10. (Amended) The composition of claim 3 wherein said blend includes at least one mono-acrylate monomer and at least one multi-acrylate monomer.

Please cancel claim 11 without prejudice or disclaimer. /

12. (Amended) The composition of claim 10 wherein the total amount of mono-acrylate monomers to the total amount of multi-acrylate monomers present in the composition, on a parts by weight basis, is 0.12-0.9 parts of mono-acrylate monomers to 1 part of multi-acrylate monomers.

13. (Amended) The composition of claim 10 wherein the total amount of mono-acrylate monomers to the total amount of multi-acrylate monomers present in the composition, on a parts by weight basis, is 0.27-0.58 parts of mono-acrylate monomers to 1 part of multi-acrylate monomers.

14. (Amended) The composition of claim 10 wherein said at least one multi-acrylate monomer includes at least one tri-acrylate monomer.

15. (Amended) The composition of claim 14 wherein the total amount of mono-acrylate monomers to the total amount of tri-acrylate monomers present in the composition, on a parts by weight basis, is 0.12-0.9 parts of mono-acrylate monomers to 1 part of tri-acrylate monomers.

16. (Amended) The composition of claim 14 wherein the total amount of mono-acrylate monomers to the total amount of tri-acrylate monomers present in the composition, on a parts by weight basis, is 0.27-0.58 parts of mono-acrylate monomers to 1 part of tri-acrylate monomers.

17. (Amended) The composition of claim 3, wherein the ratio, on a parts by weight basis, of said mixture of cationically polymerizable components to said blend of radically polymerizable components is from 3-10 parts of said mixture to 1 part of said blend.

Please cancel claim 18 without prejudice or disclaimer.

19. (Amended) The composition of claim 3 wherein said first epoxy resin includes an epoxy phenolic novolac resin and/or an epoxy cresol novolac resin.

20. (Amended) The composition of claim 19 wherein said epoxy phenolic novolac resin has on average 3.6 or more epoxy groups.

21. (Amended) The composition of claim 3 wherein said at least one other epoxy resin includes at least one cycloaliphatic epoxy.

22. (Amended) The composition of claim 3 wherein said composition further comprises a sensitizer for the photo-generated acid precursor.

23. (Amended) The composition of claim 3 wherein said blend of radically polymerizable components includes tetrahydrofurfuryl acrylate, isobornyl acrylate, lauryl acrylate and/or caprolactone acrylate.

Please cancel claim 24 without prejudice or disclaimer.

25. (Amended) The composition of claim 3 wherein said blend of radically polymerizable components includes caprolactone acrylate.

26. (Amended) A photohardenable composition comprising:  
a mixture of at least two epoxy resins wherein a first epoxy resin polymerizes at a slower rate and has a higher neat viscosity than a second epoxy resin,  
at least one mono-acrylate monomer and at least one multi-acrylate monomer,  
a photo-generated acid precursor,  
a free radical polymerization initiator, and  
water;  
wherein said first epoxy resin comprises an epoxy phenolic novolac resin and/or an epoxy cresol novolac resin.

Please cancel claim 27 without prejudice or disclaimer.

28. (Amended) The photohardenable composition of claim 26 wherein the total amount of mono-acrylate monomers to the total multi- acrylate monomers present in the composition, on a parts by weight basis, is 0.12-0.9 parts of mono-acrylate monomers to 1 part of multi-acrylate monomers.

29. (Amended) The photohardenable composition of claim 26 wherein the total amount of mono-acrylate monomers to the total amount of multi- acrylate monomers present in the composition, on a parts by weight basis, is 0.27-0.58 parts of mono-acrylate monomers to 1 part of multi-acrylate monomers.

30. (Amended) The photohardenable composition of claim 26 wherein the ratio, on a parts by weight basis, of said mixture to said mono-acrylate and multi-acrylate monomers is from 3-10 parts of said mixture to 1 part of said mono-acrylate and multi-acrylate monomers.

Please cancel claim 31 without prejudice or disclaimer.

32. (Amended) The photohardenable composition of claim 26 wherein said epoxy phenolic novolac resin has on average 3.6 or more epoxy groups.

34. (Amended) The photohardenable composition of claim 26 wherein said composition comprises a tri-acrylate monomer.

35. (Amended) The photohardenable composition of claim 26 wherein said at least one mono-acrylate monomer includes tetrahydrofurfuryl acrylate, isobornyl acrylate, lauryl acrylate and/or caprolactone acrylate.

Please cancel claim 36 without prejudice or disclaimer.

37. (Amended) The photohardenable composition of claim 26 wherein said at least one mono-acrylate monomer includes caprolactone acrylate.

38. (Amended) The photohardenable composition of claim 26 wherein said composition further comprises a sensitizer for the photo-generated acid precursor.

39. (Amended) A method for fabricating a three-dimensional article comprising:

- a. forming a layer of a photohardenable composition comprising,
  - (1) a mixture of cationically polymerizable components having at least two epoxy resins, said at least two epoxy resins including a first epoxy resin polymerizing at a slower rate and having a higher neat viscosity than at least one other epoxy resin present,
  - (2) a blend of at least one mono-acrylate monomer and at least one multi-acrylate monomer;
  - (3) at least one photo-generating acid precursor; and
  - (4) at least one free radical initiator;
- b. imagewise exposing areas of at least a portion of the layer to actinic radiation; and
- c. introducing a new layer of said composition on to the layer previously exposed imagewise in step (b) and repeating step (b).

Please cancel claim 40 without prejudice or disclaimer.

41. (Amended) The method of claim 39 wherein said first epoxy resin has a viscosity of greater than 1000 poise @ 25°C.

42. (Amended) The method of claim 39 wherein said first epoxy resin has a viscosity of greater than 200 poise @ 52°C.

43. (Amended) The method of claim 39 wherein said first epoxy resin has a softening point below 40°C.

44. (Amended) The method of claim 39 wherein said mixture of cationically polymerizable components comprises, relative to the total weight of said at least two epoxy resins, from 5 to 25% by weight of said first epoxy resin.

45. (Amended) The method of claim 44 wherein said first epoxy resin has a viscosity of greater than 1000 poise @ 25°C.

Please cancel claims 46-47 without prejudice or disclaimer.

48. (Amended) The method of claim 39 wherein the total amount of mono-acrylate monomers to the total amount of multi-acrylate monomers present in the composition, on a parts by weight, is 0.12-0.9 parts of mono-acrylate monomers to 1 part of multi-acrylate monomers.

49. (Amended) The method of claim 39 wherein the total amount of mono-acrylate monomers to the total amount of multi-acrylate monomers present in the composition, on a parts by weight basis, is 0.27-0.58 parts of mono-acrylate monomers to 1 part of multi-acrylate monomers.

50. (Amended) The method of claim 39 wherein said blend includes at least one tri- acrylate monomer.

51. (Amended) The method of claim 50 wherein the total amount of mono-acrylate monomers to the total amount of tri-acrylate monomers present in the composition, on a parts by weight basis, is 0.12-0.9 parts of mono-acrylate monomers to 1 part of tri-acrylate monomers.

52. (Amended) The method of claim 50 wherein the total amount of mono-acrylate monomers to the total amount of tri-acrylate monomers present in the composition, on a parts by weight basis, is 0.27-0.58 parts of mono-acrylate monomers to 1 part of tri-acrylate monomers.

Please cancel claim 53 without prejudice or disclaimer.

54. (Amended) The method of claim 39 wherein the ratio, on a parts by weight basis, of said mixture of cationically polymerizable components to said blend is from 3-10 parts of said mixture to 1 part of said blend.

55. (Amended) The method of claim 39 wherein said first epoxy resin includes an epoxy phenolic novolac resin and/or an epoxy cresol novolac resin.

56. (Amended) The method of claim 55 wherein said epoxy phenolic novolac resin has on average 3.6 or more epoxy groups.

57. (Amended) The method of claim 39 wherein said at least one other epoxy resin includes at least one cycloaliphatic epoxy.

58. (Amended) The method of claim 55 wherein said at least one other epoxy resin includes at least one cycloaliphatic epoxy.

59. (Amended) The method of claim 39 wherein said composition further comprises a sensitizer for the photo-generated acid precursor.

60. (Amended) A method of forming a photohardenable composition comprising:

- a. forming a mixture of epoxy resins having a first epoxy resin which polymerizes at a slower rate and has a higher neat viscosity than a second epoxy resin, said first epoxy resin having a softening point below 40°C,
- b. mixing in at least one monoacrylic monomer and at least one multiacrylic monomer, and
- c. adding a photo-generated acid precursor and a free radical polymerization.

Please cancel claim 61 without prejudice or disclaimer.



62. (Amended) The method of claim 60 further comprising admixing a sensitizer for the photo-generated acid precursor.

Please cancel claim 63 without prejudice or disclaimer.

64. (Amended) The method of claim 60 wherein said at least one multi-acrylate monomer includes a tri-acrylate monomer.

Please cancel claims 65-67 without prejudice or disclaimer.

68. (Amended) The method of claim 60 wherein the total amount of mono-acrylate monomers to the total amount of multi-acrylate monomers present in the composition, on a parts by weight basis, is 0.12-0.90 parts of mono-acrylate monomers to 1 part of multi-acrylate monomers.

69. (Amended) The method of claim 60 wherein the total amount of mono-acrylate monomers to the total amount of multi-acrylate monomers present in the composition, on a parts by weight basis, is 0.27-0.58 parts of mono-acrylate monomers to 1 part of multi-acrylate monomers.

Please cancel claim 70 without prejudice or disclaimer.

71. (Amended) The method of claim 60 wherein the ratio, on a parts by weight basis, of said mixture of epoxy resins to said at least one mono-acrylate monomer and said multi-acrylate monomer is from 3-10 parts of said mixture to 1 part of said mono-acrylate and multi-acrylate monomer.

73. (Amended) The method of claim 72 wherein said epoxy phenolic novolac resin has on average 3.6 or more epoxy groups.

Please cancel claim 77 without prejudice or disclaimer.

80. (Amended) A photohardenable composition comprising:

(a) a mixture of at least two epoxy resins, said at least two epoxy resins including a first epoxy resin polymerizing at a slower rate and having a higher neat viscosity than at least one other epoxy resin present, said first epoxy resin being present, relative to the total weight of said mixture, in an amount of from 5 to 25% by weight, said first epoxy resin having a viscosity of greater than 1000 poise @ 25°C and a softening point below 40°C,

(b) a blend of acrylate functional monomers comprising at least one multi-acrylate monomer and at least one mono-acrylate monomer, wherein the ratio of said at least one mono-acrylate monomer to said at least one multi-acrylate monomer, on a parts by weight basis, is 0.12-0.90 parts of mono-acrylate monomers to 1 part of multi-acrylate monomers,

(c) at least one photo-generating acid precursor, and

(d) at least one free radical initiator,

wherein the ratio, on a parts by weight basis, of said mixture of epoxy resins to said blend of acrylate functional monomers is from 3-10 parts of said mixture to 1 part of said blend.

81. (Amended) A method of forming a three-dimensional article comprising:
- a. forming a layer of the composition of claim 80;
  - b. imagewise exposing areas of at least a portion of the layer to actinic radiation; and
  - c. introducing a new layer of said composition on to the layer previously exposed imagewise in step (b) and repeating step (b).

83. (Amended) An article formed with the process of claim 81.

Please add new claims 84-91.

84. (New) The composition of claim 3, comprising, relative to the total weight of the composition, 0.2-3 wt% of said water.

85. (New) The composition of claim 26, comprising, relative to the total weight of the composition, 0.2-3 wt% of said water.

86. (New) The method of claim 39, wherein said composition further comprises water.

87. (New) The method of claim 39, wherein said composition comprises, relative to the total weight of the composition, 0.2-3 wt% of water.

88. (New) The method of claim 60, further comprising adding water to form said composition.

89. (New) The composition of claim 80, wherein said composition further comprises water.

90. (New) The composition of claim 80, wherein said composition comprises, relative to the total weight of the composition, 0.2-3 wt% of water.

91. (New) An object comprising the article of claim 83.